

A little further on, of Lowestoft (p. 122) :—"Recent experience, however, does not support this statement" [that the summer fish are often as abundant as they ever were before the spring-fishery came into fashion], "as with a more or less successful series of spring fisheries, the summer herrings have been exceedingly scarce for the last seven years." Now neither Yarmouth nor Lowestoft are very small or unimportant stations. It would look, then, as if scarcity has begun to appear there. Again (pp. 214, 215), Mr. Holdsworth tells a very good story of the disappearance of herrings from the Guernsey waters; but he does not contradict the statement that there has been no herring-fishery there since the year 1830. Furthermore he says (pp. 266, 267) :—"Turbot or 'bratt' nets are successfully worked by the Staithes fishermen, although, according to their report, the catches are not nearly as large as they were formerly. This is the general statement along this coast. . . . It is a remarkable circumstance that nearly thirty years ago turbot became so scarce near North Sunderland, close to Holy Island, that the turbot-nets were given up. At that time trawling in the North Sea was only just beginning from Hull and that part of the coast; and the trawlers have never worked near the place where the decrease of turbot was said to have been greater than even at Staithes. It is evident, then, that we have a good deal to learn about what attracts or drives away the fish to or from any particular locality."

To this last remark I cordially agree, for in my address I said that the consideration of our fisheries is "fraught with unusual difficulties." But while we are satisfying ourselves on this and similar points, I cannot regard with the same complacency as Mr. Holdsworth the increasing outlay of capital in improved boats and fresh fishing-gear, the growing fish-traffic on the railways, or the glories of an enlarged and renovated Billingsgate, arising amid the pious ejaculations of its frequenters. Is that the only market which is to be unaffected by inflation? I derive little comfort in allowing my fancy to run riot over the marble slabs of Cheapside, Bond Street, and Arabella Row, teeming at present with every finny delicacy, and still less when I meet the humble barrow of the East-end costermonger, with its as plentiful and more odorific load. The question is, how long will that abundance last? Incalculably great as the stock of fishes in our seas may be, it must be subject to the same laws as the stock of every other animal. Directly the draughts upon it exceed its natural increase, it must dwindle. The time when that shall happen seems from the evidence before me to be imminent.

Some of Mr. Holdsworth's remarks appear to me irrelevant. I said nothing in my address about "spawning-beds," and therefore to have mentioned the discoveries of Prof. Sars and Herr Malm would have been little to the purpose. But if my friend meant to hint that I did not know that the spawn of some fishes floats in the water during its development, I will content myself by observing that my acquaintance with Scandinavian naturalists and their works began in the year 1855. His reference to the Sea Birds' Preservation Bill also seems to be wide of the mark. But I am sure ornithologists will be thankful to him for information that will show how many of the birds named in that Act commonly prey upon the sea-fishes that come to our markets, and which kinds they take. Perhaps he will also explain why the fishermen of our coasts were so strongly in favour of its being passed. Of the precise direction my efforts took towards that end Mr. Holdsworth, I think, cannot be aware.

ALFRED NEWTON

Magdalen College, Cambridge, November 3

P.S.—If the remarks I made in my address be well founded, they of course have a general bearing, and will apply to all cases of "over-fishing." Since I wrote the above I have received from my kind friend, Prof. Baird, the United States' Commissioner of Tides and Fisheries, his reports from 1871 to 1875. Therein I find the decrease of the Sea-Fisheries on the Atlantic coast of the United States treated as a fact beyond denial, and "over-fishing" unquestionably assigned as the chief cause of that decrease.

A. N.

November 14

The Foundation of Zoological Stations in Heligoland and Kiel

WILL you kindly permit me to say a few words in answer to the letter by which my friend Mr. Balfour expressed his view on the proposed foundation of zoological stations at Heligoland and Kiel.

Mr. Balfour has certainly not been well informed, when he believes the promoters of the future stations in Heligoland and Kiel had intended "to put aside claims of the zoological station at Naples in favour of the two new institutions." In the first place it is expressly stated in their Report that the committee are far from wishing to take away the least support from the Naples establishment. Besides, according to information which reached me some time ago, one of the most competent and influential members of the committee has only consented to act, if it is expressly stated in the memorandum to be handed over to Government, "that, should the empire limit its annual contributions to zoological stations to 1,000*l.* or 1,200*l.* (a sum asked at present for the zoological station at Naples), this sum ought to go *undivided* to the Naples establishment as the one of much greater importance. The foundation of the two northern stations ought in consequence to be deferred to later times."

Nothing more than this could be desired, and certainly the proposition once made, nothing more could be expected, and had Mr. Balfour been acquainted with the whole of the facts, I am satisfied he would never have applied the terms "unwise and ungenerous" to the proposition. He is, however, certainly right in maintaining that the Naples station has been the means of proving both the value and feasibility of such institutions, and perhaps nobody, besides myself, knows better than Mr. Balfour, how great and how numerous were the obstacles which had to be overcome. This and the fact that Mr. Balfour assisted me most generously and most vigorously during the whole of my struggle, entitles him fully to disapprove of what he thinks might possibly have a detrimental influence on the fate of the Naples establishment. With regard to this apprehension I may be permitted to state that there is well founded hope that the Naples station will soon be free from such embarrassments as are the consequence of insufficient means, and that I always expected and desired a series of zoological stations to spring up which should not only follow but even rival the original one started by myself. The sudden appearance of zoological stations on the Normandy coast, at Trieste, Sebastopol, the foundation of the late Anderson School of Natural History in the United States, the proposition to create two stations at Heligoland and Kiel, and another plan to erect a station on the White Sea, brought before the Association of Russian Naturalists in Warsaw, furnish indubitable proofs that my belief was well founded. It may be that too little circumspection has been used in founding or planning several of these institutions; nevertheless their great number and rapid augmentation justify me in giving to my establishment such dimensions and so distinct an international character as to carry it as far beyond competition as possible.

I hope to be able to enter more fully into the development of the Naples station in the Second Annual Report, which I think will be ready next spring. It will show that till now the station has not only not suffered from competition but has been increasing very considerably the range of its activity and influence on the progress of biology.

ANTON DOHRN

Berlin, November 5

The Deep-sea Manganiferous Muds

IN the very interesting Address delivered by Sir C. Wyville Thomson, at Glasgow, on the *Challenger* expedition, while referring to the "red clay" deposit so general over the deepest parts of the Atlantic and North Pacific, the remarkable fact is mentioned that the clay contains numerous nodules of peroxide of manganese, which in some places are found in great quantity.¹ The Address goes on to say :—"This is a phenomenon which we are as yet unable to explain, and I do not know that there is any analogous instance in any of the older formations" (*NATURE*, vol. xiv., p. 494).

It is possible that this can be accounted for in the same manner as the formation of the "red clay" itself, assuming that the explanation given by Sir C. Wyville Thomson is the correct one, as there can be but little reason to doubt. It is true that exception has been taken to it by Dr. Carpenter, who considers the "red clay" to be "a *post-mortem* deposit in the chambers of the foraminifera."² It does not clearly appear, however, where such a *post-mortem* pseudomorphic deposit could come from in this case, while, were that opinion correct, then the *Globigerina* ooze

¹ See also "Report to Hydrographer of the Admiralty on the Cruise of H.M.S. *Challenger*," Prof. Wyville Thomson, F.R.S., *Proc. Roy. Soc.*, vol. xxiv., p. 39.

² "Remarks on Prof. Wyville Thomson's Preliminary Notes on the Nature of the Sea-bottom," &c. *Proc. Roy. Soc.*, vol. xxiii., p. 244.

itself ought also to form a pseudomorphic deposit of the same kind.

Accepting, then, Sir Wyville Thomson's theory, the manganiferous deposit might be accounted for as follows:—

Manganese occurs in sea-water in very small quantities, sufficient, nevertheless, for detection. Forchhammer has detected it together with iron and silica; as also have Figuer and Mialhe.¹ It is, besides, almost invariably found in the waters of some springs, according to Prof. T. Sterry Hunt,² and spring-water sooner or later finds its way to the ocean. Again, it is found in the ashes of plants,³ and it is therefore not unlikely that it may be secreted by other organisms, such as foraminifera, molluscs, &c.—in fact, Bischof found in the outer scale of oyster-shells 0.61 per cent. of ferric oxide, with some oxide of manganese⁴—and as its carbonate is isomorphous with that of lime and iron, it is perfectly probable that these should be found associated together, as indeed they usually are. Supposing, then, *Globigerina* shells to consist of carbonate of lime, with small traces of carbonate of iron, carbonate of manganese, peroxide of iron, and silicate of alumina, the following changes might take place while the shell was passing through water charged with carbonic acid gas and oxygen.

All the carbonates would first be dissolved. Then the carbonates of iron and manganese would be oxidised, as they readily part with carbonic acid in presence of oxygen, and the liberated carbonic acid would, no doubt, act on a fresh portion of the mixed carbonates. The silicate of alumina and peroxide of iron already in the shell⁵ would not be affected. Thus there would be a continual deposition of silicate of alumina, peroxide of iron, and peroxide of manganese, very likely both hydrated. It is taken for granted here that the red clay is merely a silicate of alumina coloured by peroxide of iron, and not a double silicate of iron and alumina. It does not seem quite clear which is really meant in any of the reports. Alumina is found in small traces in river- and sea-water, perhaps in many cases as the silicate, which is soluble in minute proportions. Or it might originally exist as sulphate, in that state enter into the structure of marine organisms, and subsequently undergo alteration to silicate. Alumina has been found in small quantities in plants, but how combined is not yet known.

I believe the principal deposits of manganese ores are found in connection with limestone or dolomitic rocks, probably for the most part originally disseminated through them in small proportions, and subsequently concentrated in particular localities by the action of infiltrating water, and the nearest approach to the phenomenon described by Sir Wyville Thomson appears to be met with in the associated limestone, dolomite, iron ore, and nodular manganese ore of the Lahn district, as recorded by Bischof.⁶ At the place where the iron and manganese beds are worked, there are several clay beds, varying from a few feet to several fathoms in thickness. These Bischof considers are the result of the continuous action of water containing carbonic acid, the argillaceous limestone being converted into clay. The manganese and iron ores lie beneath the clay beds, and it is most likely that these minerals were extracted from the argillaceous limestone at the same time as the carbonate of lime, having doubtless existed in small quantities as carbonates in the organisms forming the mass. In fact the lower clay beds still contain some manganese. There is thus considerable analogy between the two cases, the difference being that these old limestones having been formed in mass, in not very deep water, were not liable to be dissolved—immediately on the death of the organisms whose skeletons they were—by the action of sea-water, that part being played ages afterwards by atmospheric water. The result has been mainly the same, however, viz., the production of clay from the limestone, together with nodular manganese. Possibly had the corals, &c., forming that limestone had the opportunity of falling slowly, and each isolated, through

a sufficient depth of sea-water, the result would have been a manganiferous mud, similar to these deep-sea clays.

As to the nodular structure of the manganese oxide, it is of course referable to the same mysterious molecular attraction which determines the segregation of all the carbonate of iron in the case of clay-ironstone in fire-clays and shales, and silica, as in chalk flints.

Since the above was written, the last number of the *Proceedings* of the Royal Society (vol. xxiv. No. 170), with Preliminary Reports on the Cruise of the *Challenger*, by Sir C. Wyville Thomson and colleagues, has come to hand. These reports contain a full description of the manganiferous muds, but no theory as to the origin of the manganese is as yet put forward.

EDWARD T. HARDMAN,
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Mr. Wallace on the Distribution of Passerine Birds

IN Mr. Wallace's recently-published work on Geographical Distribution, in more than one place the results arrived at from an inspection of his elaborate tables of genera and families do not agree with the numbers he uses in considering the general bearing of the facts adduced. Thus in his "General Remarks on the Distribution of the Passeres," vol. ii. pp. 299-302, he says (*i.e.* p. 300): "The families that are confined to single regions are not very numerous, except in the case of the Neotropical region, which has *five*, the Australian has only *three*, the Oriental one, Ethiopian one, and the other regions have no peculiar families." Adopting his tables of the families of the Passeres, I find the numbers should be really as follows:—

Neotropical	7	...	Fams. Nos.	39 ^a , 40, 41, 42, 44, 45, 46.
Australian	5	...	"	21, 22, 25, 49, 50.
Oriental	3	...	"	11, 12, 43.

The Nearctic region should also be mentioned as possessing one peculiar family, *i.e.* Chamæidæ. The statement that none of the turdoid Passerine families are exclusively American must also be modified to meet this fact. There are three families (*i.e.* Paictidæ, Pittidæ, Eurylæmidæ), instead of *two*, of the Formicarioid Passeres in the Old World, of which the Pittidæ can hardly be said to have only a "very restricted distribution."

The Australian genus *Struthideia*, of doubtful position, seems omitted altogether.

W. A. FORBES

Cambridge, Oct. 30

Antedon Rosaceus (*Comatula rosacea*)

THERE are one or two rather hasty conclusions in the letters you have recently published upon the feather-star, which I will take the liberty of pointing out. My friend, Major Lang, arguing from his experience in Torbay, says: "It is evident that the habitat of *Comatula* is strictly defined, viz., in comparatively deep water, and amongst rocks." Last year, however, I took it in Salcombe Estuary, in shallow water, and not among rocks, but among the *Zostera marina*, to which numbers of the young stalked forms were sticking. The well-known marine zoologist, Mr. Hincks, tells me that he took both the adult and stalked forms in great abundance in the same locality more than twenty years ago.

The President of the Birmingham Natural History and Microscopical Society, in commenting upon Major Lang's letter and other notices of the capture of the feather-star, says, "It is a most remarkable circumstance, therefore, that in the space of about three years, the species should have become numerous to the extent alluded to by Major Lang, more than a hundred being taken in one haul of the dredge." But this rapid increase in the numbers of the species since 1873 is imaginary, for dredgings in the two previous years had yielded the adult form by bucketsful from the neighbourhood of the Thatcher Rock.

In regard to the name, one can only wish for a scientific dictator to restore Lamarck's happily appropriate designation *Comatula*, in place of the earlier name, *Antedon*, the meaning and pronunciation of which are alike difficult to determine. It would be interesting to learn from political economists, in what category of labour, productive or unproductive, those investigations should be reckoned, which end in displacing some name universally received and understood in favour of one forgotten and obsolete. Justice to the ancient observer is pleaded as a chief reason for these revivals. But it is a poor renown to have helped to increase the ever-growing burden of scientific nomenclature.

Torquay, Nov. 6

THOMAS R. R. STEBBING

¹ Bischof, "Chem. Geo.," vol. i., pp. 99-108.

² "Chem. and Geo. Essays," p. 143.

³ Fownes' "Man. of Chem.," p. 469; also Watts' "Chem. Dict."

⁴ *Op. cit.*, vol. i., p. 198.

⁵ It may be that there is a trace of uncombined ferric oxide already in these shells, since the *Globigerina* oozes, when treated with very dilute acid, leaves a red sediment like the "red clay" (see "The Cruise of the *Challenger*," NATURE, vol. xiv. p. 96). Sir Wyville hesitates to claim for the silicate of alumina and peroxide of iron that they exist in that form in the shells, rather supposing them to be products of alteration. But the latter is certainly found in some shells and in red corals. It has been shown by Prof. A. H. Church that the red chalk of Hunstanton, treated with very weak acid, yields a residue closely resembling the deep-sea "red clay."

Chem. News, xxxi. p. 199.

⁶ *Op. cit.*, vol. iii. p. 193.